

Project Name: Optimizing Real-Time Management of Surface and Surface Drainage Return Flows From Seasonally Managed Wetlands in the San Joaquin River Basin

Implementing Organization: Grassland Water District

The Proposed project will comprise enhancement, improvement in functionality and expansion of the existing GWD sensor network. The project tasks have been divided into three major activities: (1) sensor network rehabilitation and enhancement; (2) data acquisition and processing using new RF telemetry network; (3) model calibration and forecast modeling of salinity management options within the Grassland WD. Task 1. Acquire and replace key monitoring station data logging and telemetry hardware with Hydro Scientific West RTU's and RF modems. a) Acquire data logging and telemetry hardware from Hydro Scientific West. b) Replace YSI-ECONet RTU's and modems at all monitoring locations needed for real-time decision making and accounting of salt loading imported and exported from GWD. c) Reconstruct 216 control structure to accommodate the installation of a re-circulation pump to discharge into the Mosquito ditch. d) Deploy YSI, SONTEK and/or MACE transducers and sondes at new monitoring stations to enhance District monitoring and facilitate real-time salt management decision making capacity including actions to hold water within selected pond impoundments, reuse surface and subsurface drainage water and operate groundwater conjunctive use well fields for supplemental water supply. e) Complete programming of the RTU's at the new and upgraded stations to provide real-time access to station data from a central receiving station in Grassland Water District headquarters. Task 2. Enhance and maintain the WISKI hydro-logical data management system software on the GWD server. a) Develop WISKI-SODA communication protocols to allow WISKI server to automatically poll real-time flow and EC data provided at current and new monitoring sites and download current data. b) Update WISKI database to incorporate new monitoring stations. c) Develop WISKI WebPro to allow continuous web-access to monitoring data at all District locations. d) Export key drainage data to WARMF-Online data server for sharing with San Joaquin Basin stakeholders as part of obligation under the Board-approved real-time salinity management MOU. Task 3. Use GWD real-time sensor network data to calibrate the WARMF-SJR wetland module for salinity management decision support. a) Compile data and parse current GWD real-time flow and salinity data into specific format for use by WARMF-SJR model. b) Acquire available climatic, water diversion, wetland flooded area and other important hydro-logic data to simulate sub-watersheds for the WARMF-SJR wetland module. c) Meet with wetland staff in GWD, State and Federal refuges to validate data being used in WARMF-SJR wetland module. d) Run simulations and calibrate wetland flow and salt load outputs against drainage data from GWD and State and Federal refuges (if available). Change parameter values for soil hydraulic conductivity, wetland ET, flooded area and wetland hydro-period to improve calibration. e) Make estimates of subsurface drainage contribution to combine surface and subsurface drainage flows using information on groundwater levels and flow in GWD conveyance channels. f) Develop Manager Module for wetland operators to simplify use of model for wetland drainage forecasting. g) Apply model at commencement of wetland draw down to predict salt loading to Mud slough, Los Banos Creek and the San Joaquin River. h) Obtain feedback from GWD Water Master and GWD field personnel to improve model simulations and forecasts. i) Use model to develop estimates of annual water quality benefits to the San Joaquin River salinity as a result of real-time salinity management actions.